
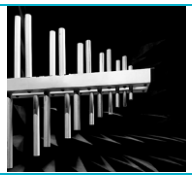
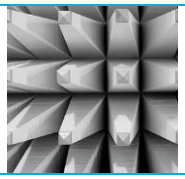

CTC advanced
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BNetzA-CAB-02/21-102

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6872/18-01-05 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	SFX-TMB4A
ISED number	10140A-TMB4A
HVIN (Hardware Version Identification Number)	TMB4A
PMN (Product Marketing Name)	B1
FVIN (Firmware Version Identification Number)	-/-
HMN (Host Marketing Name)	-/-

This report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

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EUT technologies:

Technologies:	Max. rated power: (AVG)	Max. gain:
WLAN 2450 – Ant 1	Declared: max 25 dBm (conducted)	2.1 dBi
WLAN 2450 – Ant 2	Declared: max 15 dBm (conducted)	2.1 dBi
10.50 to 10.55 GHz Radar	Declared: max 29.0 dBm (EIRP)	--
24.075 to 24.175 GHz Radar	Declared: max 32.0 dBm (EIRP)	--

Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG / 4\pi R^2$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna
PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled “Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure”

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

Prediction: worst case

	Technologies:	WLAN - Ant 1	WLAN - Ant 2	10 GHz Radar	24 GHz Radar	
	Frequency (MHz)	2450	2450	10525	24100	
PG	Declared max power (EIRP)	27.1	17.1	29	32	dBm
R	Distance	20	20	20	20	cm
S	MPE limit for uncontrolled exposure	1	1	1	1	mW/cm^2
	Calculated Power density:	0.1021	0.0102	0.1581	0.3155	mW/cm^2
	Calculated percentage of Limit:	10.21%	1.02%	15.81%	31.55%	
	Collocation:					
	Scenario: All WLANs and Radars active. Calculated percentage of Limit:	58.59%				

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.

Prediction of MPE limit at given distance - ISED

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Prediction: worst case

		WLAN - Ant 1	WLAN - Ant 2	10 GHz Radar	24 GHz Radar	
	Frequency	2450	2450	10525	24100	MHz
R	Distance	20	20	20	20	cm
P	Max power input to the antenna	25	15	--	--	dBm
G	Antenna gain	2.1	2.1	--	--	dBi
PG	Maximum EIRP	27.1	17.1	29.0	32.0	dBm
PG	**Maximum EIRP**	512.9	51.3	794.3	1584.9	mW
	Exclusion Limit from above:	2.71	2.71	5.00	5.00	W
	Calculated percentage of Limit:	18.90%	1.89%	15.89%	31.70%	
	Collocation:					
	Scenario: All WLANs and Radars active. Calculated percentage of Limit:	68.38%				

Conclusion: RF exposure evaluation is not required.